



Mantis Stereo Viewing System

Operating Instructions

And

Service Manual

Use this manual only after assembling the Mantis Viewing system.

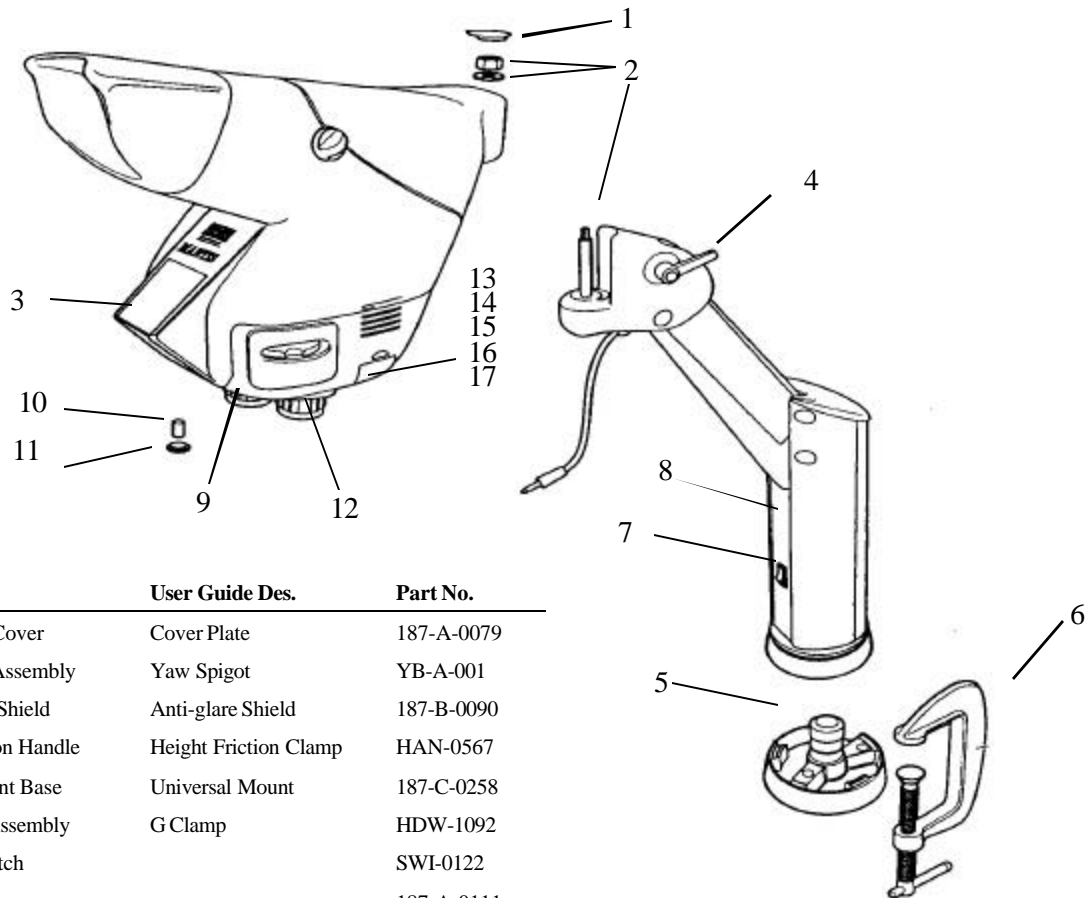
After assembling the Mantis Stereo Viewing System you should be familiar with its various components. These instructions will help you become familiar with the operation and use of the Mantis as well as some of the available options. Also included in this manual is a more comprehensive maintenance, troubleshooting and service guide.

NOTE: REFER TO THE MANTIS USER GUIDE AS REQUIRED

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SYSTEM DIAGRAMS

MANTIS UNIVERSAL BOOM MOUNT

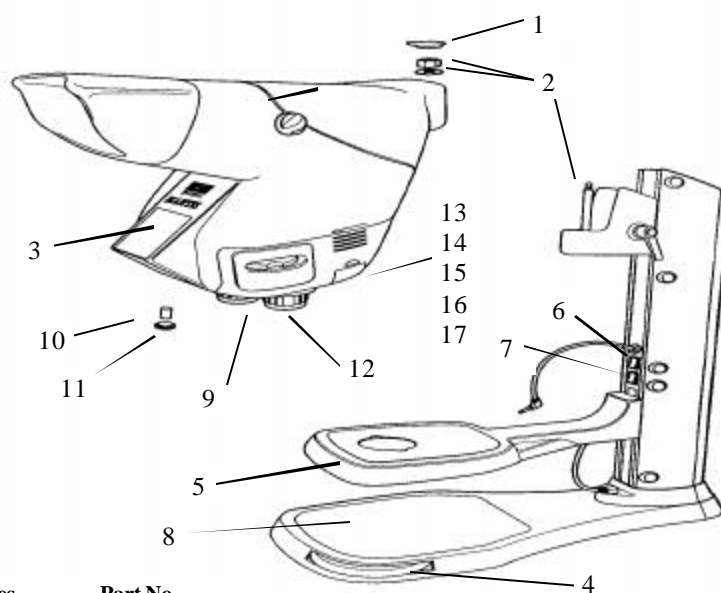


Description	User Guide Des.	Part No.
1. Yaw Bolt Cover	Cover Plate	187-A-0079
2. Yaw Bolt Assembly	Yaw Spigot	YB-A-001
3. Anti-glare Shield	Anti-glare Shield	187-B-0090
4. Adj. Friction Handle	Height Friction Clamp	HAN-0567
5. Table Mount Base	Universal Mount	187-C-0258
6. C Clamp Assembly	G Clamp	HDW-1092
7. Power Switch		SWI-0122
8. Switch Cover		187-A-0111
9. Fan Cover Assembly		187-A-0211
10. Desiccant(10 pack)	Desiccant Cartridge	M006
11. Grommet		HDW-1030
12. Turret Assembly		187-A-0208
13. Filter Tray - Left		187-C-0076
14. Filter Tray - Right		187-C-0075
15. Lamp Diffuser		187-A-0115
16. Lamp Diffuser(Blue)		187-A-0115A
17. Lamp, 12volt, 20watt		LAM-1300

SYSTEM DIAGRAM



MANTIS FX BENCH STAND



Description	User Guide Des.	Part No.
1. Yaw Bolt Cover	Cover Plate	187-A-0079
2. Yaw Bolt Assembly	Yaw Spigot	YB-A-001
3. Anti-glare Shield	Anti-glare Shield	187-B-0090
4. Focusing Thumbwheel		
5. Focusing Platform		187-D-292*
6. Surface Lighting Switch		
7. Substage Lighting Switch		
8. FX Base		187-C-0310
9. Fan Cover Assembly		187-A-0211
10. Desiccant(10 pack)	Desiccant Cartridge	M006
11. Grommet		HDW-1030
12. Turret Assembly		187-A-0208
13. Filter Tray - Left		187-C-0076
14. Filter Tray - Right		187-C-0075
15. Lamp Diffuser		187-A-0115
16. Lamp Diffuser(Blue)		187-A-0115A
17. Lamp, 12volt, 20watt		LAM-1300
*Requires Sub-Assembly		187-B-307

SYSTEM DIAGRAM

The Basic Systems

2) The Basic Systems

The Mantis Stereo Viewing System is a powerful optical inspection system. The patented optical technology provides a bright, crystal clear overhead image in a fatigue free viewing environment. Long working distance offers ample room for rework and part rotation.

Mantis systems are available in two versions. One version is the boom mount (refer to page 3 of this manual) which can be mounted on almost any table surface. This is good for general inspection, viewing and rework, especially in a production environment. The other version is the Mantis FX (refer to page 4 of this manual). This version has a portable stand that resembles a traditional microscope stand. This version is better suited to off-line inspection.

Each Mantis system can be equipped with any two of the objective lenses listed below. It is common to use a lower magnification lens (such as 2X or 4X) for general inspection and a higher magnification lens (such as 8X or 10X) for closer inspection of possible defects.

Mantis - Boom Mount

Description	Vision Engineering Inc. Part No.
1) Mantis viewing head	M001
2) Mantis Boom Mount	M003

Mantis FX - Bench Stand

Description	Vision Engineering Inc. Part No.
1) Mantis viewing head	M001
2) FX Bench Stand	M002

Objectives - For use with either system

Description	Vision Engineering Inc. Part No.
1) 2X Magnification Lens	M222
2) 4X Magnification Lens	M444
3) 6X Magnification Lens	M004
4) 8X Magnification Lens	M008
5) 10X Magnification Lens	M009
6) 6X SLWD Magnification Lens	M013

The 6X SLWD magnification lens has a much longer working distance than the standard 6X magnification lens. It is specifically designed for rework applications.

Objective Specifications

3) Objective Specifications

The Mantis objectives provide different levels of magnification ranging from 2X to 10X. As magnification changes, working distance (the distance between the objective lens and the subject when properly focused), field of view (the area of subject that is visible in the viewing screen at any one time) and depth of field (the maximum subject height variation that will remain in focus) also change. The chart below shows the characteristics of each lens.

Lens	Working Distance	Field of View	Depth of Field
2X	171 mm ~ 6.7 in.	56 mm ~ 2.2 in.	25 mm ~ 1.0 in.
4X	86 mm ~ 3.4 in.	28 mm ~ 1.1 in.	11 mm ~ 0.4 in.
6X	55 mm ~ 2.2 in.	20 mm ~ 0.8 in.	5 mm ~ 0.2 in.
6X SLWD	112 mm ~ 4.4 in.	20 mm ~ 0.8 in.	5 mm ~ 0.2 in.
8X	41 mm ~ 1.6 in.	15 mm ~ 0.6 in.	3 mm ~ 0.1 in.
10X	41 mm ~ 1.6 in.	12 mm ~ 0.5 in.	2.5 mm ~ 0.1 in.

Using the Mantis

4) Using the Mantis

Turning the Power “ON”

Boom Mount (refer to page 3 of this manual)

There is one power switch for the Mantis boom mount system. It is located on the front panel of the vertical support column. Flip the switch to energize the Mantis illuminator

FX Bench Stand (refer to page 4 of this manual)

There are three power switches for the Mantis FX bench stand system. The first is the main power switch. It is located on the back of the bench stand vertical support. When energized the switch is illuminated. The remaining power switches are on the front of the bench stand vertical support. The upper switch powers the main illuminator incorporated in the Mantis viewing head. The lower switch powers the substage illuminator built into the focusing platform.

Focusing

All of the Mantis objective lenses (except 2X) are parfocal. This means that the image stays in focus when switching between objectives without re-focusing. For best results always focus with the highest magnification lens, then switch to the lower magnification.

Boom Mount (refer to page 3 of this manual)

To focus the boom mount Mantis system move the Mantis viewing head “UP” or “DOWN”. (Before moving the Mantis head always loosen the boom friction clamp lever located on the right side of the boom mount pivot). To facilitate focusing there are 4 plastic lugs located on the underside of the Mantis head. Hold one of the lugs between your thumb and index finger and gently move the head until proper focus is obtained. Tighten the boom friction clamp.

FX Bench Stand (refer to page 4 of this manual)

To focus the FX bench stand locate the focus adjustment wheel on the front, right hand corner of the bench stand base plate. Turning this wheel will move the focusing platform “UP” or “DOWN”. With a subject on the focusing platform look into the viewing screen and turn the focus adjustment wheel until a clear image is obtained.

Adjusting the Lighting

The main illuminator built into the Mantis viewing head features an adjustment to optimize lighting for different applications. The illumination adjustment is a horizontal disc on the right side of the Mantis viewing head. Rotate the disc while looking into the viewing screen until optimal lighting is achieved.

4) Using the Mantis (con’t)

Changing the Magnification (refer to pages 3 or 4 of this manual)

Both Mantis systems use a turret assembly to allow the user to select between two different magnification levels. Objective lenses are screwed onto the threaded turret underneath the Mantis viewing head.

After two objectives have been selected and screwed into place on the Mantis turret, they can be switched using the objective selection lever. The lever is located on the left side of the Mantis viewing head. The objective selection lever can be moved into two positions. Each position corresponds to a different objective lens being activated. Select the position that provides the magnification required for your application.

Adjusting the Eye Spacing (IPD)

The Mantis has an adjustment for different eye spacing. The Inter-pupillary Distance (IPD) must be adjusted to obtain a comfortable view. The IPD adjustment is located on the right side of the Mantis viewing head. While looking in the viewing screen rotate the adjustment knob (the left side optical path will move “LEFT” or “RIGHT”) until a comfortable view is achieved.

Note: This adjustment is very important to comfortable and effective inspection. It must be re-adjusted for every individual using the Mantis.



Options

5) Options

Lens Protective covers

All mantis objectives can be fitted with a replaceable, clear plastic protective cap. These inexpensive caps protect the objective lens from damage and are especially useful when using the Mantis for rework operations. Choose from the chart below.

Lens	Vision Engineering Part No.
2X, 4X, 6X, 8X	M010
6X SLWD	M016
10X	M011

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Maintenance

6) Maintenance

Lamp Replacement (refer to pages 3 or 4 of this manual)

Replace the lamps using the following procedure.

- 1) Remove the Mantis viewing head by removing the Yaw Spigot nut.
- 2) Turn the Mantis viewing head upside down.
- 3) Remove the lamp cover (filter tray) by sliding it away from the Mantis head. Do not allow the diffuser lens to drop when removing the lamp covers.
- 4) Pull the lamp out by holding it between your thumb and index finger.
- 5) Replace lamp.
- 6) Reassemble by reversing previous steps.

Lens Cleaning

Clean the objective lens using a lint free cloth. An anti-static cleaner may be used to reduce static charging.

If frequent contamination is experienced it is recommended to use the optional Protective Lens Covers.

Moisture Control (refer to pages 3 or 4 of this manual)

The Mantis head is equipped with a blue desiccant cartridge for moisture control. This should be checked regularly. When the desiccant turns pink it is ready for replacement.

To replace the cartridge remove the rubber plug under the Mantis viewing head, pull out the desiccant cartridge, replace and re-install the rubber plug.

Replace with Desiccant 10 pack, Part No. M006.

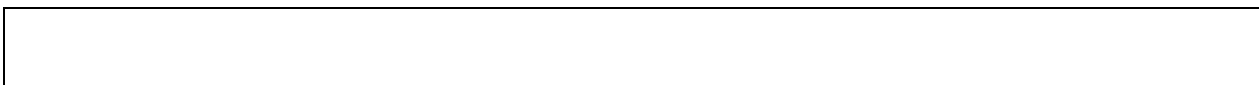
Optical Path Alignment

It is a good idea to periodically check the Optical Path Alignment of the Mantis stereo view. Look into the viewing screen from a distance of 12". The view will appear as two illuminated circles. These two circles must be horizontally aligned within 2/3 of their diameter of each other. Improper alignment will cause imaging problems.

If the illuminated circles are out of alignment then they can be adjusted. Locate the large Phillips screw head on the back of the Mantis viewing head (this screw head is locked in place with black silicon). While still looking at the viewing screen from a 12" distance, adjust the screw until the two paths are in acceptable alignment.

Fan (refer to pages 3 or 4 of this manual)

Blow out the fan assembly with CLEAN, DRY AIR (up to 100 PSI) at least once a month to prevent excessive particulate build-up. This will maximize fan life.



Troubleshooting

7) Troubleshooting

Mantis has no power

If the Mantis head has no power and the illuminator will not come “ON” then check the following items:

- Is the Mantis power cord plugged in?
- Is the wall outlet functioning properly and supplying sufficient voltage?
- Is the fuse in the Mantis support column in good working condition?

Optical View

If over time the optical view of the Mantis has degraded, check for the following:

Are the objectives dirty or damaged?

- Dirty or damaged lenses will cause an inferior image.

Are both lighting lamps functioning properly?

- Both lights must be working to supply sufficient light.

Is the Eye Spacing control properly adjusted?

- The eye spacing adjustment must be set correctly to obtain a comfortable view.

Has the lighting adjustment been used to optimize the lighting?

- Optimized lighting is important to maintaining a clear image.

Have the Mirrors within the Mantis head become dirty?

- Mirrors contaminated with particulate will impede image performance.

Is the viewing screen dirty?

- Clean the viewing screen regularly to prevent dirt build-up from degrading the image.

Has the Optical Path alignment been checked?

- Proper Optical path alignment will greatly improve viewing ease.

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Service

8) Service

Should the Mantis stereo viewing system require service the unit may be returned to Vision Engineering Inc. Some of the simpler repair procedures are discussed here to prevent excessive downtime.

Cleaning the mirrors

The mirrors within the Mantis viewing head can be cleaned. These mirrors are very delicate and can only be blown off with clean, dry air. **Never** wipe the mirrors with any type of cloth.

Required Tools:

Small Phillips screwdriver

Medium Phillips screwdriver (magnetic preferred)

Work in a dust free environment

1. Remove the Mantis viewing head from its support by removing the Yaw bolt.
2. Rest the viewing head upside down (objective turret facing "UP")
3. Remove the two screws on the rear of the viewing head.
4. Remove both filter trays to gain access to the lamps. Do not allow the diffuser lens to drop when removing the lamp covers.
5. Remove the screw located in each lamp socket.
6. The lower viewing head assembly (black lower section) should now be removable
7. Turn the lower viewing head assembly over to prevent dust accumulation on the mirror.
8. **Without Touching the Mirrors**, blow off mirrors with CLEAN, DRY AIR while holding unit upright. Ensure that any dust falls out of the viewing head.
9. If any contaminant is on the beam splitter, it can be gently wiped with a soft cloth.
10. Reassemble by reversing the disassembly instructions.

8) Service (con't)

Fan Replacement

Required Tools:

Small Phillips screwdriver

Medium Phillips screwdriver

Work in a dust free environment

1. Remove the objective lenses.
2. Remove the Mantis viewing head from its support by removing the Yaw bolt.
3. Rest the Mantis viewing head upside down (turret facing "UP")
4. Remove the three screws from the turret.
5. Remove the two screws on the infinity lens.
6. Remove the two screws holding the fan assembly in place.
7. Remove the two screws on the rear of the Mantis viewing head.
8. Remove both filter trays providing access to the lamps. Be careful not to allow the diffuser lens to drop when removing the filter tray.
9. Remove the single screw in each lamp socket.
10. The lower viewing head assembly (black lower section) now lifts off.
11. Gently turn over the viewing head assembly to reduce the risk of the mirror collecting dust.
12. Disconnect fan wires from P.C. board and remove old fan. Pay close attention to the wire connection orientation on the P.C. board.
13. Install new fan. Feed new fan wires through grommet one at a time. Connect the wires to the P.C. board being careful to follow the same orientation as the prior fan.
14. Reassemble by reversing disassembly steps.

8) Service (con't)

Repairing Eye Spacing Control (IPD)

Required Tools:

Small Phillips screwdriver

Medium Phillips screwdriver (magnetic preferred)

Work in a dust free environment

1. Remove the magnification objectives
2. Remove the Mantis viewing head from its support by removing the Yaw bolt.
3. Remove the eye spacing adjustment knob.
4. Rest the Mantis head upside down (turret facing "UP").
5. Remove the two screws on the rear of the viewing head.
6. Remove both filter trays providing access to the lamps. Be careful not to allow the diffuser lens to drop when removing filter tray.
7. Remove the single screw from each lamp socket.
8. The lower viewing head assembly (lower black section) can now be removed.
9. Gently turn over the viewing head assembly to reduce the chance of dust collecting on the mirror.
10. **Without Touching the Mirrors**, replace the detached pin through the viewing head and into the narrow groove on the eye spacing control knob.
11. If necessary, blow off the mirrors with CLEAN, DRY AIR while holding the unit upright. Ensure that any dust falls out of the viewing head.
12. Reassemble by reversing the disassembly steps.

8) Service (con't)

Remove Mirror from Mantis Head

In the event that a mirror become dislodged within the Mantis viewing head it may be possible to reattach it by following these steps. If a repair cannot be made then follow these steps to

remove the loose mirror. Removing the loose mirror will prevent any internal damage during shipping when returning the unit for service. The mirror can now be packed separately and both units sent back to the factory for service.

Required Tools:

Small Phillips head screwdriver

Medium Phillips head screwdriver (magnetic preferred)

Work in a dust free environment

1. Remove the Mantis viewing head from its support by removing the Yaw bolt.
2. Rest the viewing head upside down (turret facing "UP").
3. Remove the two screws on the rear of the viewing head.
4. Remove both filter trays providing access to the lamps. Be careful not to let the diffuser lens drop when removing the filter trays.
5. Remove the single screw in each lamp socket.
6. The lower viewing head assembly (lower black section) can now be removed.
7. **Without Touching the Mirror**, remove the mirror or reattach if required.
8. Reassemble by reversing the disassembly steps.



Warranty

9) Warranty

This product is warranted to be free from defects in material and workmanship for a period of one year from the date of invoice to the original purchaser.

If, during the warranty period the product is found to be defective, it will be repaired or replaced at facilities of Vision Engineering Inc. or elsewhere, all at the option of Vision Engineering Inc. However, Vision Engineering Inc. reserves the right to refund the purchase price if it is unable to provide replacement, and repair is not commercially practicable or cannot be timely made. Parts not of Vision Engineering Inc. manufacture carry only the warranty of their manufacturer. Expendable components such as lamps and fuses carry no warranty.

This warranty does not cover damage caused in transit, damage caused by misuse, neglect, or carelessness, or damage resulting from either improper servicing or modification by other than Vision Engineering Inc. approved service personnel. Further this warranty does not cover any routine maintenance work which is reasonably expected to be performed by the purchaser.

No responsibility is assumed for unsatisfactory operating performance due to environmental conditions such as humidity, dust, corrosive chemicals, deposition of oil or other foreign matter, spillage, or other conditions beyond the control of Vision Engineering Inc..

Except as stated herein, Vision Engineering Inc. MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED BY LAW, WHETHER OR MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE. Further, Vision Engineering Inc. shall not under any circumstances be liable for incidental, consequential or other damages.



Information

10) Information

Vision Engineering Inc. is committed to providing top quality optical inspection systems. We employ a staff of trained Sales and Service engineers and have a network of Authorized distributors to assist you. Please call whenever you have questions.

For additional information contact your local Vision Engineering Distributor or call:

Corporate Headquarters
Vision Engineering Inc.
570 Danbury Road
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Phone: (860) 355-3776

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